

Terra Environmental Research Institute

Please complete all problems, record your answers on the cover sheet provided and show all work on your own paper.

Simplify the following expressions.

- $(12x^2 + 9xy - 20y^2) - (10x^2 - xy)$
- $7\sqrt{72} - \sqrt{180} + \sqrt{98} - 10\sqrt{245}$
- $(9 + \sqrt{2})(5 - \sqrt{11})$
- $(\sqrt{13} - \sqrt{6})^2$
- $\sqrt{36x^4y^{16}}$
- $\sqrt{-128} \cdot \sqrt{-192}$
- $\frac{6}{16 + \sqrt{5}}$
- $y^{\frac{18}{3}} y^{\frac{36}{3}}$
- $\left(y^{\frac{20}{3}}\right)^{\frac{40}{3}}$
- $\frac{3p^4}{5q^5(r-5)^3} \cdot \frac{37q^2(r-5)}{54p^3}$
- $\frac{5x^2y^3}{3a^5b^4} \div \frac{23x^5y}{57a^7b^3}$
- $\frac{5(a^2 + 5a + 6)}{3(a^2 - 25)} \div \frac{23(a + 3)}{39(a + 5)}$
- $\frac{d}{5f^2}$
- $\frac{d^4}{32f^8}$
- $\frac{7x^2 - 7}{x}$
- $\frac{7(x^2 + 7)}{2x^2 - 19x}$
- $\frac{3}{4x^2 - 25} + \frac{4}{2x + 5}$
- $\frac{13}{xy^2} - \frac{3y^2}{8x^2}$
- $(15x^{-7}y^3)(-8xy^2)$
- $\left(\frac{20x^{20}y^6}{10x^{10}y^{12}}\right)^2$
- $\frac{30x^2 + 41x + 6}{45x^2 + 14x - 48}$
- What is $\sqrt{15435}$ divided by $\sqrt{5}$?
- Write the expression $(4^5)^{\frac{7}{4}}$ in radical form and simplify.
- Rewrite the expression $\sqrt[8]{11x^{10}y^2}$ using rational exponents

Solve each equation:

23. $4(8x + 3) - 9(7x + 7) = 42$

24. $2|2x + 5| = 116$

25. $\frac{x}{x+8} = \frac{2}{15}$

26. $-x^2 + 11x + 5 = 0$

27. Write the equation, in slope-intercept form, for the line that passes through (-13, -11) and (24, 26).

28. Write an equation in slope-intercept form for the line that is perpendicular to the graph of $4x + 10y = 22$ and passes through (-7, 13).

29. Solve the system of equations:

$$\begin{cases} -2a = 24 \\ 5a + 2c = 4 \\ 9b + 9c = 18 \end{cases}$$

30. Solve the system of equations using substitution. Then, describe it as consistent independent, consistent dependent, inconsistent, or none of these.

$$\begin{cases} 7x + 6y = 7 \\ 2x + y = 17 \end{cases}$$

Find the difference quotient:

31. $f(x) = 5x + 1$

32. $f(x) = x^2 - 10$

33. $f(x) = 3x^2 + 4$

34. $f(x) = -2x^2 + 5x - 6$

35. Factor: $1 - 8x^3$

Solve the given inequalities.

36. $6 + \sqrt{8x + 5} > 19$

37. $\sqrt{6x - 8} + 6 \leq 12$

38. Graph the function: $f(x) = x^2 + 2x - 8$. Find the vertex, and the intercepts.

39. Write the equation $9y = 18x + 1.1$ in standard form. Identify A, B and C.

40. Solve by using the Square Root Property: $16x^2 + 48x + 36 = 1$

41. Solve by completing the square: $x^2 - x - 20 = 0$

42. Graph: $y = (x - 4)^2 - 6$

43. Graph: $y > x^2 - 4x + 3$
44. Find all the rational zeros of the function $f(x) = 78x^4 + 143x^3 - 39x^2 - 26x$
45. Let $f(x) = 15x + 16$ and $g(x) = -13x^2 + 6x + 26$. Find $(f - g)(x)$
46. Let $f(x) = 10x^2 - 5x - 8$ and $g(x) = 12x - 3$. Find $(f \bullet g)(x)$
47. Find $(g \circ h)(x)$ for $g(x) = 2x$ and $h(x) = -10x - 7$
48. Find the inverse of the function $f(x) = \frac{11x - 15}{22}$
49. Evaluate $f(x) = -5x + 10$ for $x = 10$

Factor completely.

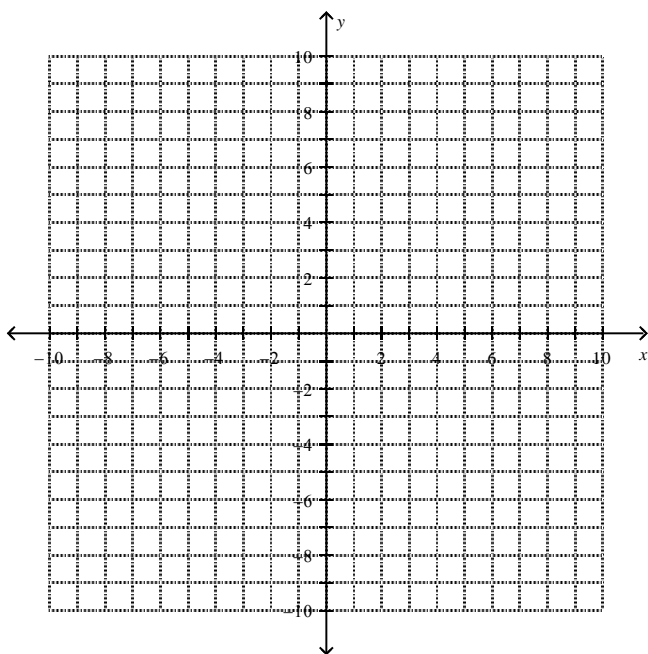
50. $5x^2 - 9x + 4$
51. $38xy - 57y - 36x + 54$
52. Simplify using long division: $(2x^2 - 65x + 32) \div (x - 32)$
53. Simplify using synthetic division: $(11x^3 - 64x^2 + 111x - 54) \div (x - 3)$

Name: _____ Per: _____ Date: _____

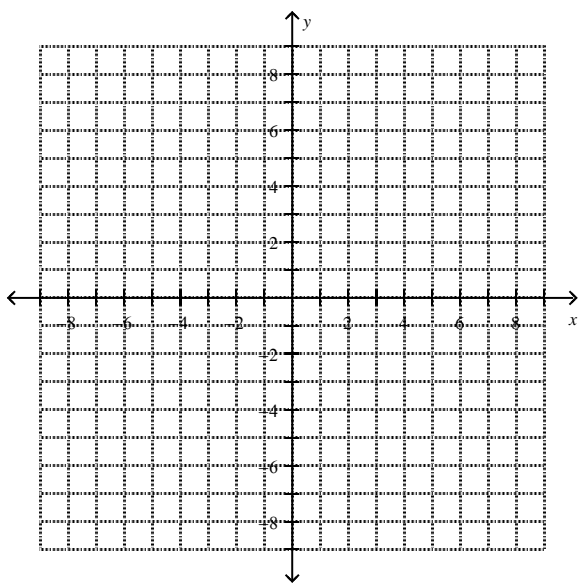
Terra Environmental Research Institute
Summer Assignment for Pre-Calculus, Advanced Math Topics,
or Math for College Readiness Students
Cover Sheet – Please staple work to the back

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|-----|-----|---------------|
| 1) | 19) | 37) |
| 2) | 20) | 38) see graph |
| 3) | 21) | 39) |
| 4) | 22) | 40) |
| 5) | 23) | 41) |
| 6) | 24) | 42) see graph |
| 7) | 25) | 43) see graph |
| 8) | 26) | 44) |
| 9) | 27) | 45) |
| 10) | 28) | 46) |
| 11) | 29) | 47) |
| 12) | 30) | 48) |
| 13) | 31) | 49) |
| 14) | 32) | 50) |
| 15) | 33) | 51) |
| 16) | 34) | 52) |
| 17) | 35) | 53) |
| 18) | 36) | |

38) Vertex: _____ x -intercept(s): _____ y -intercept: _____



42)



43)

